

1 Distribution of SO₂ Frost on Io from Infrared Observations in 1993.

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Much remains unknown about the surface composition of Io. Sulfur dioxide frost is one of the few materials where there is unambiguous evidence for its presence. However, little is known about possible changes in its distribution. We present data here collected in February 1992 at the NASA Infrared Telescope Facility, Mauna Kea Hawaii using the Aerospace Corp. liquid-N₂-cooled spectrograph. The instrument uses two 58 - element Blocked Impurity Band linear arrays to cover the 3 - 13 μ m wavelength region with a resolving power of 30 - 120. The absorption feature due to SO₂ frost is present at 4.08 μ m. The band depth, measured using the values at 3.47 μ m for the continuum and at 4.08 μ m for the band minima, was roughly 50% on both the leading and trailing hemisphere and ranged between 45-55% in the regions measured. This similarity between the leading and trailing hemisphere differs from observations collected between 1976 and 1982 discussed in Howell et al. (Icarus, vol. 57, p 83-92, 1984). The spectra in Howell et al. show almost a factor of 2 difference in the band depth between the leading hemisphere (b.d. roughly 80%) and the trailing hemisphere (b.d. roughly 40%, but with some measurements as high as 60%). Comparing the two sets of observations, it is clear that between 1982 and 1993, the SO₂ frost distribution on the leading hemisphere has changed dramatically. Io's volcanic activity is an obvious source of this change, and the relationship between volcanic activity and SO₂ frost distribution and abundance will be explored. Part of this work was done at JPL/Caltech, under contract to NASA. *Visiting Scientist at the NASA Infrared Telescope Facility.

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